

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method of streaming media data ~~comprising:~~ by transmitting a plurality of ~~encoded~~ data packets as a data packet stream over a network from a source server to a client device, ~~wherein~~ the client device ~~comprises~~ comprising a source decoder for ~~decoding the encoded packets,~~ decoding wherein the client device further ~~comprises~~ and a pre-decoder buffer for buffering the media data temporarily prior to decoding into an uncompressed data format having a variable initial buffering time and a variable buffer size; receiving the data packets transmitted by the source server at the pre-decoder buffer of the client device prior to decoding in the source decoder of the client device; and dynamically adapting the variable initial buffering time and the variable buffer size of the pre-decoder buffer for improving playback performance of the client device, the method comprising buffering the media data in the pre-decoder buffer of the client device in accordance with a buffering algorithm and operating the source server to verify that the data packet stream transmitted from the source server to the client device complies with the buffering algorithm, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide substantially correct playback of the media data at the client

device when the data packet stream is transmitted over a constant-delay reliable transmission network.

2. (Currently amended) The method of claim 1, ~~wherein the client device submits~~ comprising submitting a request from the client device to the source server to set at least one of the ~~variable~~ pre-decoder initial buffering time and the ~~variable~~ pre-decoder buffer size ~~of the pre-decoder buffer.~~

3. (Currently amended) The method of claim 1, ~~wherein~~ comprising defining a default values ~~for the variable~~ pre-decoder initial buffering time and the ~~variable~~ a default minimum pre-decoder buffer size ~~are defined for the pre-decoder buffer.~~

4. (Currently amended) The method of claim 3, ~~wherein the client device signals~~ comprising signaling at least one of the default values ~~for the variable~~ pre-decoder initial buffering time and the ~~variable~~ default minimum pre-decoder buffer size ~~for the pre-decoder buffer~~ from the client device to the source server.

5. (Currently amended) The method of claim 1, ~~wherein the~~ comprising adjusting the ~~variable~~ pre-decoder initial buffering time ~~of the pre-decoder buffer is dynamically adapted by~~ in the client device responsive to an indication of a required pre-decoder initial buffering time received from the source server.

6. (Currently amended) The method of claim 1, ~~wherein the variable~~
comprising adjusting the pre-decoder buffer size of the pre-decoder buffer is dynamically
~~adapted by~~ in the client device responsive to an indication of a required pre-decoder
buffer size received from the source server.

7. (Currently amended) The method of claim 1, ~~wherein~~ comprising
providing the source server with a plurality of copies pre-encoded media streams
representative of the same media data content ~~are available to the source server, each of~~
~~the plurality of copies of the media data being characterized by at least one parameter~~
~~indicative of a required property of the pre-decoder buffer in the client device and~~
signaling the client device to indicate at least one of a pre-decoder initial buffering time
and a pre-decoder buffer size required in the client to ensure correct playback of each
available pre-encoded media stream.

8. (Cancelled)

9. (Cancelled)

10. (Cancelled)

11. (Currently amended) The method of claim 1, ~~wherein the dynamic~~
~~adaptation is an adaptation performed by~~ comprising adjusting at least one of the pre-

decoder initial buffering time and the pre-decoder buffer size in the client device responsive to a change in required pre-decoder buffer parameters signal received from signaled by the source server during a streaming session.

12. (Cancelled)

13. (Currently amended) The method of claim 1, ~~wherein the buffering algorithm causes the source server to adjust~~ comprising adjusting the transmission times of data packets from the source server to the client device in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

14. (Cancelled)

15. (Currently amended) The method of claim 1, ~~wherein~~ comprising implementing a post-decoder buffer ~~is implemented~~ in the client device to ~~reduce~~ absorb decoding-related delay variations.

16. (Cancelled)

17. (Previously presented) The method of claim 1, wherein the media data is transmitted to a wireless client device and the network comprises a wireless network, the

wireless network being selected from a group comprising: a GPRS (General Packet Radio Service) wireless network and a UMTS (Universal Mobile Telecommunications System).

18. (Currently amended) A system for streaming media data by transmitting a plurality of data packets containing the media data as a data packet stream, the system comprising:

a source server hosting the media data;

a network serving as a transmission medium for the data packets containing the media data; and

a client device capable of playing back ~~the~~ media data recovered from the data packets, ~~wherein~~ the client device ~~comprises~~ comprising:

a source decoder; and

a pre-decoder buffer coupled to the source decoder for receiving
~~the transmitted data packets from the source server via the~~
~~network~~ buffering the media data temporarily prior to
decoding into an uncompressed data format in the source
decoder, ~~the pre-decoder buffer having a variable initial~~
~~buffering time and a variable buffer size;~~

~~a decoder coupled to the pre-decoder buffer for decoding the data~~
~~packets received by the pre-decoder buffer; and~~

~~means for dynamically adapting the variable initial buffering time~~
~~and the variable buffer size of the pre-decoder buffer;~~

~~wherein the dynamic adaptation of the variable initial
buffering time and the variable buffer size improves
playback performance of the client device~~

wherein the client device is arranged to buffer the media data in the
pre-decoder buffer in accordance with a buffering algorithm and
the source server is arranged to verify that the data packet stream
transmitted from the source server to the client device complies
with the buffering algorithm, behavior of the buffering algorithm
being affected by a pre-decoder initial buffering time and a
minimum pre-decoder buffer size, the minimum pre-decoder buffer
size corresponding to a minimum size of the pre-decoder of the
pre-decoder buffer required to provide substantially correct
playback of the media data at the client device when the data
packet stream is transmitted over a constant-delay reliable
transmission network.

19. (Previously presented) The system of claim 18, wherein the network comprises a wireless network selected from a group comprising: a GPRS (General Packet Radio Service) wireless network and a UMTS (Universal Mobile Telecommunications System).

20. (Previously presented) The system of claim 19, wherein the client device is a wireless terminal compatible for data packet use by the wireless system.

21. (Cancelled)

22. (Currently amended) A client device for receiving streaming media data, the media data being received at the client device in a plurality of data packets transmitted as a data packet stream over a network from a source server, ~~the data packets containing media data, wherein~~ the client device ~~comprises~~ comprising:

a source decoder; and

a pre-decoder buffer coupled to the source decoder for receiving the transmitted data packets from the source server via the network buffering the media data temporarily prior to decoding into an uncompressed data format in the source decoder the pre-decoder buffer having a variable initial buffering time and a variable buffer size;

a decoder for decoding the data packets from the pre-decoder buffer; and

means for dynamically adapting the variable initial buffering time and the variable buffer size of the pre-decoder buffer for improved playback performance by the client device

wherein the client device is arranged to buffer the media in the pre-decoder buffer in accordance with a buffering algorithm and the source server is arranged to verify that the data packet stream transmitted from the source server to the client

device complies with the buffering algorithm, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide substantially correct playback of the media data at the client device when the data packet stream is transmitted over a constant-delay reliable transmission network.

23. (Currently amended) The client device of claim 22, ~~wherein the client device is~~ selected from a group comprising: a wireless terminal, a desktop computer, ~~and~~ a laptop computer and a set-top box.

24. (New) A method according to claim 1, further comprising:

- sending signaling from the client device to the source server to indicate at least one of a pre-decoder initial buffering time and a minimum pre-decoder buffer size; and
- operating the server to verify the transmitted data packet stream according to the buffering algorithm, using the signaled pre-decoder initial buffering time and / or minimum pre-decoder buffer size.

25. (New) A method according to claim 3, wherein the default pre-decoder initial buffering time and default minimum pre-decoder buffer size are defined implicitly.

26. (New) A method according to claim 25, comprising sending signaling from the client device to the source server to indicate the client device's pre-decoder buffering capabilities to the source server if these are superior to those defined by said default values.

27. (New) A method according to claim 1, wherein the source server retrieves pre-decoder buffering capabilities for the client device from a capability server.

28. (New) A method according to claim 1, wherein the source server adjusts the way in which the media data is encoded and packetized in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

29. (New) A method according to claim 1, wherein the client device is one of the following: a wireless terminal, a desktop computer, a laptop computer or a set-top box.

30. (New) A system according to claim 18, wherein the client device is further arranged to send signaling to the source server to indicate at least one of a pre-decoder initial buffering time and a minimum pre-decoder buffer size and the source server is further arranged to verify the transmitted data packet stream according to the buffering

algorithm, using the signaled pre-decoder initial buffering time and / or minimum pre-decoder buffer size.

31. (New) A system according to claim 18, wherein a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size are defined for the pre-decoder buffer of the client device and the source server is arranged to verify the transmitted data packet stream according to the buffering algorithm using said default values.

32. (New) A system according to claim 31, wherein the client device is arranged to signal at least one of the default pre-decoder initial buffering time and the default minimum pre-decoder buffer size to the source server in connection with setting up a streaming session with the source server.

33. (New) A system according to claim 31, wherein the default pre-decoder initial buffering time and default minimum pre-decoder buffer size are defined implicitly.

34. (New) A system according to claim 33, wherein the client device is arranged to signal its pre-decoder buffering capabilities to the source server if these are superior to those defined by said default values.

35. (New) A system according to claim 18, wherein the source server is arranged to retrieve pre-decoder buffering capabilities for the client device from a capability server.

36. (New) A system according to claim 18, wherein the client device is arranged to adjust its pre-decoder initial buffering time responsive to an indication of a required pre-decoder initial buffering time received from the source server.

37. (New) A system according to claim 18, wherein the client device is arranged to adjust its pre-decoder buffer size responsive to an indication of a required pre-decoder buffer size received from the source server.

38. (New) A system according to claim 18, wherein the source server is provided with a plurality of different pre-encoded media streams representative of the same media content, and is arranged to signal at least one of a pre-decoder initial buffering time and a pre-decoder buffer size required in the client device to ensure correct play-back of each available pre-encoded media stream.

39. (New) A system according to claim 18, wherein the client device is arranged to adjust at least one of its pre-decoder initial buffering time and its pre-decoder buffer size responsive to a change in required pre-decoder buffer parameters signaled by the source server during a streaming session.

40. (New) A system according to claim 18, wherein the source server is arranged to adjust the transmission times of data packets from the source server to the client device in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

41. (New) A system according to claim 18, wherein the source server is arranged to adjust the way in which the media data is encoded and packetized in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

42. (New) A system according to claim 18, wherein the client device is one of the following: a wireless terminal, a desktop computer, a laptop computer or a set-top box.

43. (New) A client device according to claim 22, wherein the client device is arranged to send signaling to the source server to indicate at least one of a pre-decoder initial buffering time and a minimum pre-decoder buffer size for use by the source server to verify the transmitted data packet stream according to the buffering algorithm.

44. (New) A client device according to claim 22, wherein a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size are defined for the pre-decoder buffer of the client device.

45. (New) A client device according to claim 44, wherein the client device is arranged to signal at least one of the default pre-decoder initial buffering time and the default minimum pre-decoder buffer size to the source server in connection with setting up a streaming session with the server.

46. (New) A client device according to claim 44, wherein the client device is arranged to signal its pre-decoder buffering capabilities to the source server if these are superior to those defined by said default values.

47. (New) A client device according to claim 22, wherein the client device is arranged to adjust its pre-decoder initial buffering time responsive to an indication of a required pre-decoder initial buffering time received from the source server.

48. (New) A client device according to claim 22, wherein the client device is arranged to adjust its pre-decoder buffer size responsive to an indication of a required pre-decoder buffer size received from the source server.

49. (New) A client device according to claim 22, wherein the client device is arranged to:

- receive signaling from the source server indicative of at least one of a pre-decoder initial buffering time and a pre-decoder buffer size required to

- provide correct play-back of each of a number of different pre-encoded media streams representative of the same media content;
- select one of the different pre-encoded media streams for playback at the client device; and
- adjust its pre-decoder initial buffering time and pre-decoder buffer size according to the requirements of the selected media stream.

50. (New) A client device according to claim 22, wherein the client device is arranged to adjust at least one of its pre-decoder initial buffering time and its pre-decoder buffer size responsive to a change in required pre-decoder buffer parameters signaled by the source server during a streaming session.

51. (New) A server for streaming media data by transmitting a plurality of data packets as a data packet stream to a client device, the client device comprising a source decoder and a pre-decoder buffer for buffering the media data temporarily before decoding into an uncompressed data format in the source decoder of the client device, wherein the server is arranged to verify that the data packet stream transmitted from the server to the client device complies with a buffering algorithm used in the client device to buffer the media data in the pre-decoder buffer, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide substantially correct playback of the media data at the

client device when the data packet stream is transmitted over a constant-delay reliable transmission network.

52. (New) A server according to claim 51, wherein the server is further arranged to receive signaling from the client device indicative of at least one of a pre-decoder initial buffering time and a minimum pre-decoder buffer size and to verify the transmitted data packet stream according to the buffering algorithm using the signaled pre-decoder initial buffering time and / or minimum pre-decoder buffer size.

53. (New) A server according to claim 51, wherein a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size are defined for the pre-decoder buffer of the client device and the server is arranged to verify the transmitted data packet stream according to the buffering algorithm using said default values.

54. (New) A server according to claim 53, wherein the server is arranged to receive signaling indicative of at least one of a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size in connection with setting up a streaming session.

55. (New) A server according to claim 53, wherein the default pre-decoder initial buffering time and default minimum pre-decoder buffer size are defined implicitly.

56. (New) A server according to claim 51, wherein the server is arranged to retrieve pre-decoder buffering capabilities for the client device from a capability server.

57. (New) A server according to claim 51, wherein the server is arranged to provide an indication of a required pre-decoder initial buffering time to the client device.

58. (New) A server according to claim 51, wherein the server is arranged to provide an indication of a required pre-decoder buffer size to the client device.

59. (New) A server according to claim 51, wherein the server is provided with a plurality of different pre-encoded media streams representative of the same media content, and is arranged to signal at least one of a pre-decoder initial buffering time and a pre-decoder buffer size required in the client device to ensure correct play-back of each available pre-encoded media stream.

60. (New) A server according to claim 51, wherein the server is arranged to signal a change in required pre-decoder buffer parameters to the client device during a streaming session.

61. (New) A server according to claim 51, wherein the server is arranged to adjust the transmission times of data packets from the server to the client device in order

to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

62. (New) A server according to claim 51, wherein the server is arranged to adjust the way in which the media data is encoded and packetised in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

63. (New) A method for buffering media data in a client device, the media data being received at a client device as a data packet stream from a server, the client device comprising a pre-decoder buffer for buffering the media data temporarily before decoding into an uncompressed data format, wherein the method comprises buffering the media data in the pre-decoder buffer of the client device in accordance with a buffering algorithm, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide substantially correct playback of the media data at the client device when the data packet stream is transmitted over a constant-delay reliable transmission network.

64. (New) A method according to claim 63, further comprising sending signaling from the client device to the server to indicate at least one of an pre-decoder

initial buffering time and a minimum pre-decoder buffer size for use by the server to verify the transmitted data packet stream according to the buffering algorithm.

65. (New) A method according to claim 63, further comprising defining a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size for the pre-decoder buffer of the client device.

66. (New) A method according to claim 65, wherein the client device signals at least one of the default pre-decoder initial buffering time and the default minimum pre-decoder buffer size to the server in connection with setting up a streaming session with the server.

67. (New) A method according to claim 65, wherein the client device signals its pre-decoder buffering capabilities to the server if these are superior to those defined by said default values.

68. (New) A method according to claim 63, wherein the client device adjusts its pre-decoder initial buffering time responsive to an indication of a required pre-decoder initial buffering time received from the server.

69. (New) A method according to claim 63, wherein the client device adjusts its pre-decoder buffer size responsive to an indication of a required pre-decoder buffer size received from the server.

70. (New) A method according to claim 63, further comprising:

- receiving at the client device signaling from the server indicative of at least one of a pre-decoder initial buffering time and a pre-decoder buffer size required to provide correct play-back of each of a number of different pre-encoded media streams representative of the same media content;
- selecting one of the different pre-encoded media streams for playback at the client device; and
- adjusting the pre-decoder initial buffering time and pre-decoder buffer size of the pre-decoder buffer according to the requirements of the selected media stream.

71. (New) A method according to claim 63, wherein the client device adjusts at least one of its pre-decoder initial buffering time and its pre-decoder buffer size responsive to a change in required pre-decoder buffer parameters signaled by the server during a streaming session.

72. (New) A method for transmitting media data as a data packet stream from a server to a client device, the client device comprising a pre-decoder buffer for buffering

the media data temporarily before decoding into an uncompressed data format, wherein the method comprises operating the server to verify that the data packet stream transmitted from the server to the client device complies with a buffering algorithm used in the client device to buffer the media data in the pre-decoder buffer, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide substantially correct playback of the media data at the client device when the data packet stream is transmitted over a constant-delay reliable transmission network.

73. (New) A method according to claim 72, wherein the server receives signaling from the client device indicative of either one or both of a pre-decoder initial buffering time and a minimum pre-decoder buffer size and verifies the transmitted data packet stream according to the buffering algorithm using the signaled pre-decoder initial buffering time and / or minimum pre-decoder buffer size.

74. (New) A method according to claim 72, wherein a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size are defined for the pre-decoder buffer of the client device and the server verifies the transmitted data packet stream according to the buffering algorithm using said default values.

75. (New) A method according to claim 74, wherein the server receives signaling indicative of at least one of a default pre-decoder initial buffering time and a default minimum pre-decoder buffer size in connection with setting up a streaming session.

76. (New) A method according to claim 74, wherein the default pre-decoder initial buffering time and default minimum pre-decoder buffer size are defined implicitly.

77. (New) A method according to claim 72, wherein the server retrieves pre-decoder buffering capabilities for the client device from a capability server.

78. (New) A method according to claim 72, wherein the server provides an indication of a required pre-decoder initial buffering time to the client device.

79. (New) A method according to claim 72, wherein the server provides an indication of a required pre-decoder buffer size to the client device.

80. (New) A method according to claim 72, wherein the server is provided with a plurality of different pre-encoded media streams representative of the same media content and signals at least one of a pre-decoder initial buffering time and a pre-decoder buffer size required in the client device to ensure correct play-back of each available pre-encoded media stream.

81. (New) A method according to claim 72, wherein the server signals a change in required pre-decoder buffer parameters to the client device during a streaming session.

82. (New) A method according to claim 72, wherein the server adjusts the transmission times of data packets from the server to the client device in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

83. (New) A method according to claim 72, wherein the server adjusts the way in which the media data is encoded and packetized in order to ensure that the transmitted data packet stream does not exceed the buffering capabilities of the pre-decoder buffer in the client device.

84. (New) A data signal comprising media data, said data signal comprising a plurality of data packets for transmission as a data packet stream to a client device, the client device comprising a pre-decoder buffer for buffering the media data temporarily before decoding into an uncompressed data format, wherein the data signal complies with a buffering algorithm used in the client device to buffer the media data in the pre-decoder buffer, behavior of the buffering algorithm being affected by a pre-decoder initial buffering time and a minimum pre-decoder buffer size, the minimum pre-decoder buffer size corresponding to a minimum size of the pre-decoder buffer required to provide

substantially correct playback of the media data at the client device when the data packet stream is transmitted over a constant-delay reliable transmission network.